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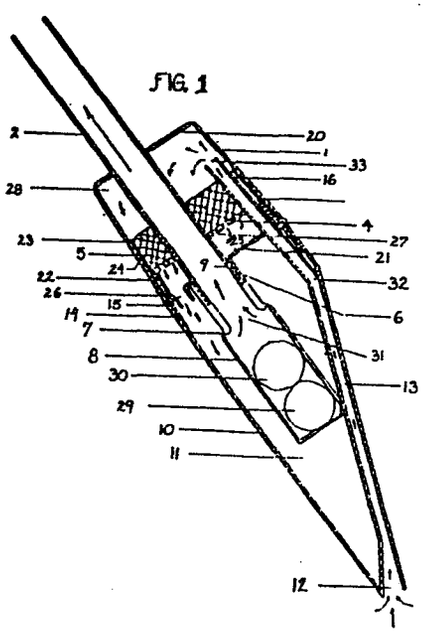
(54) Liquid aspirator vacuum attachment.

(57) A liquid aspirator which may be connected to a conventional vacuum cleaner has two separate body parts. The rear body part is provided with an extended tube into which can be inserted a hose from a conventional vacuum cleaner. Also the rear body part holds a cartridge which contains a filter and a filter support where liquid is filtered. The front body part acts as the liquid reservoir and is provided with a tube connected to the front nozzle of the front body part. The tube extends along the top of the front body part and protrudes through the filter cartridge to the back of the rear body part. The liquid aspirated by suction of the vacuum cleaner is discharged to the rear of the assembled unit. The filter cartridge slows down air and water speed and distributes liquid to the front liquid reservoir.



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LIQUID ASPIRATOR VACUUM ATTACHMENT

TECHNOLOGICAL FIELD

This invention relates to a liquid aspirator which attaches to standard vacuum cleaner hoses, thereby preventing water damage to the vacuum cleaner motor.

BACKGROUND

Liquid may be extracted from carpets and floors by many apparatuses which may be connected to standard vacuum hoses or are self-contained larger units. All of the apparatuses used are designed for large amounts of liquid and are constructed so that liquid aspirated is discharged into large reservoirs. The large reservoirs thus make it necessary to concentrate filters and baffles inside of the reservoir or in front of shut-off valves.

These devices entail many major inconveniences in that besides all being large and awkward to use. If the devices are accidentally tipped over or laid on the floor while the electric motor of the vacuum is still running, liquid may be drawn past the out off valves and into the electric motors. Water splash in their reservoirs is sometimes directed to the electric motor. If detergents are also picked up with liquid, suds created inside the reservoir may not allow the floats, designed to stop air flow, to activate when required. Thus the danger of electric shock exists with such prior art devices. When these devices are laid on the floor or tipped over while suction of the

cleaner is terminated, liquid may also run back out of nozzles onto the floor creating an inconvenience.

The present invention overcomes such inconveniences and provides a small, compact, lightweight unit which attaches conveniently to any vacuum hose.

These disadvantages may be overcome by constructing the device much smaller than any other and allowing the device to pick up smaller quantities at any one time.

BRIEF DESCRIPTION OF THE INVENTION

In accordance with the invention, a liquid aspirator is provided which includes walls defining a body having an interior space, attachment means on said body for attaching a vacuum to said body to draw a vacuum within the interior space, a wall within said body dividing said body into an air compartment and a water reservoir within said body, said vacuum attachment means including a tube extending into said water reservoir; walls in said body defining a front nozzle on said body, said walls also defining a traverse tube extending from said front nozzle to said air compartment within said body, said tube extending into said water reservoir having an opening into said water reservoir so that said tube may draw a vacuum on said water reservoir, said opening in said tube being positioned and said body being so shaped that there is less volume below said opening when said front nozzle is directed in a gravitationally downward direction as compared to any other direction.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a longitudinal section through the complete liquid aspirator unit;

FIGURE 2 is a perspective view of device showing external front and rear body parts;

FIGURE 3 is a perspective view of the rear body part;

FIGURE 4 is a perspective view of the filter;

FIGURE 5 is a perspective view of the retainer plate;

FIGURE 6 is a perspective view partly in section of the filter cartridge;

FIGURE 7 is a perspective view of the valve seal and cage containing two ball floats; and

FIGURE 8 is a perspective view of the front body part with parts broken away.

DETAILED DESCRIPTION

In the attached drawings the liquid aspirator consists of a rear body part 1 from which a protruding end piece 2 fastens to a conventional vacuum cleaner hose (not shown) and acts as a handle. A cartridge 24 (shown in Figure 6), contains a retainer plate 4 (shown in Figure 5), a filter made of porous material 5 (shown in embodiment Figure 4). The cartridge is secured into rear body part 1 by threaded extension 6 which also comprises rubber

out-off seal 7 (see Figure 1) as well as float cage 8 all molded into one unit (shown in Figure 7). The threaded extension 6 is fastened to the end of the main airflow tube 9 after the cartridge is inserted into the rear body part 1. The front body part 10 which consists of water reservoir 11, front nozzle 12 and liquid traverse tube 13 are all molded into one unit (see Figure 8) and fastened to rear body part 1 by sliding onto front extension lip 14 of the cartridge.

A rubber seal 15 molded directly to the cartridge creates a water tight seal between rear body part 1 and front body part 10. During assembly the extension pipe 16 of liquid traverse tube 13 which is connected directly to front body part 10, slides through opening 17 on cartridge 3 opening 18 on retainer plate 4 and opening 19 in filter 5. The extension pipe 16 does not touch the back wall 20 of rear body part 1. Retainer plate 4 is held apart from inside wall 21 of cartridge 3 by small spacers 22 molded into inner walls 23 of inside lip 24 of the cartridge thus creating air compartment 25.

During operation a vacuum is created by a conventional vacuum cleaner. The vacuum cleaner's hose is connected to extension tube 2. A vacuum is then created in liquid reservoir 11. Air is then drawn through opening 26 on the filter cartridge, creating a vacuum in air chamber 25. Air is then drawn through openings 27 in retainer plate 4 and through filter 5, creating a vacuum in rear air compartment 28 of rear body unit 1 and thereby drawing air and liquid through traverse tube 13 from

front nozzle 12 of front body part 10. Liquid enters air chamber 28 at high speed and is slowed down by filter 5 and retainer plate 4 of cartridge 24. Liquid is then discharged through openings 27, which are spaced evenly across the area of retainer plate 4, at a slow speed into air chamber 25. This action stabilizes splash. Water is funneled at a slow speed through opening 26 of the cartridge into reservoir 11. Retainer plate 4 also serves the purpose of holding filter 5 back from being drawn into opening 21 of the cartridge.

As the liquid level in reservoir 11 rises, the ball float 29 pushes ball float 30 toward rubber seal 7. Ball float 29 serves the purpose of providing sufficient distance between water level and rubber seal 7 so as no droplets of liquid are drawn through opening 31 from air speed or air turbulance. When liquid reaches a predetermined point, ball float 30 seals opening 31 by closing the opening between ball float 30 and rubber seal 7. Ball floats 30 and 29 are guided into position by float cage 8. To eliminate any possibility of liquids being drawn past the ball floats 29, 30 when unit is laid down or tipped upside down while the motor of vacuum is still operating, the tube 9 protruding through the rear body part 1, filter 5, retainer plate 4 and cartridge wall 21, extends into the reservoir 11 far enough that the maximum capacity of liquid allowed into the reservoir cannot flow over the valve seat 7 at any angle. The volume of liquid which can be aspirated when the device is in a vertical position is less than the volume of liquid required to rise above the

rubber seal 7 and enter opening 31 when the device is in a horizontal or inverted position. The volume of liquid flows around an axis point at the mount of opening 31. The traverse tube 13 also serves the purpose that when the device is put on the ground upside down or at any angle and suction is terminated by switching off the vacuum, liquid may not escape back out the nozzle 12 because of angle 32 which demands the liquid to stay in compartment 28 by gravity. Should the device be laid on its side or any other angle, the opening 33 of traverse pipe 13 is in such a position that liquid cannot enter. The front and rear body parts may be separated easily to empty the reservoir, thus resetting the floats to enable the apparatus to perform again.

CLAIMS

1. A liquid aspirator comprising:

walls defining a body having an interior space, attachment means on said body for attaching a vacuum to said body to draw a vacuum within the interior space, a wall within said body dividing said body into an air compartment and a water reservoir within said body, said vacuum attachment means including a tube extending into said water reservoir;

walls in said body defining a front nozzle on said body, said walls also defining a traverse tube extending from said front nozzle to said air compartment within said body, said tube extending into said water reservoir having an opening into said water reservoir so that said tube may draw a vacuum on said water reservoir, said opening in said tube being positioned and said body being so shaped that there is less volume below said opening when said front nozzle is directed in a gravitationally downward direction as compared to any other direction.

2. The liquid aspirator of Claim 1 wherein said

wall separating said body includes a filter to separate particulate matter from a stream of material vacuumed through said front nozzle and said traverse tube into said air compartment before the stream passes into said water reservoir.

3. The liquid aspirator of Claim 2 wherein said

filter rests against a perforate plate extending adjacent said inside wall which separates said air compartment from said water reservoir.

4. The liquid aspirator of Claims 1 or 3 wherein said

body is formed as a rear body part and a front body part, which are separable from each other, said rear body part and said front body part being attached by means of a cartridge which fits within both of said body parts and seals to both said body parts.

5. The liquid aspirator of Claim 4 wherein said

tube extends through said cartridge.

6. The liquid aspirator of Claim 5 wherein there is a float valve adjacent said opening in said tube so that when water rises in said reservoir adjacent said opening in said tube, said float valves closes said opening.

7. A liquid aspirator comprising:

walls defining a body including a wall across the interior of said body to define an air compartment within said body and a water reservoir within said body, said walls defining an exterior front nozzle on the water reservoir end of said body and a liquid traverse tube extending from said front nozzle to said air compartment within said body;

vacuum attachment means including a tube extending into said water reservoir adjacent said wall dividing said body for attachment to a vacuum

source for drawing a vacuum in said water reservoir; and

a filter positioned between said air compartment and said water reservoir to filter particulate matter out of stream flow drawn by the vacuum into said front nozzle and through said traverse tube into said air compartment.

8. The liquid aspirator of Claim 7 wherein said

body is formed of separable front and rear body portions and there is a cartridge joining and sealing to both of said body portions to separably retain together said body portions.

9. The liquid aspirator of Claim 8 wherein said cartridge includes said filter and a perforated retainer plate, and said filter lying against said retainer plate so that said retainer plate inhibits motion of said filter toward said liquid reservoir.

10. The liquid aspirator of Claims 7, 8 or 9 wherein the

opening in said vacuum tube in said water reservoir is positioned and said walls defining said water reservoir are shaped so that there is less volume in said water reservoir below said opening when said front nozzle is gravitationally below said opening than when said front nozzle is above said opening; and a float valve is positioned adjacent said opening so that when water rises to a position adjacent said opening, said float valve closes said opening.

FIG. 1

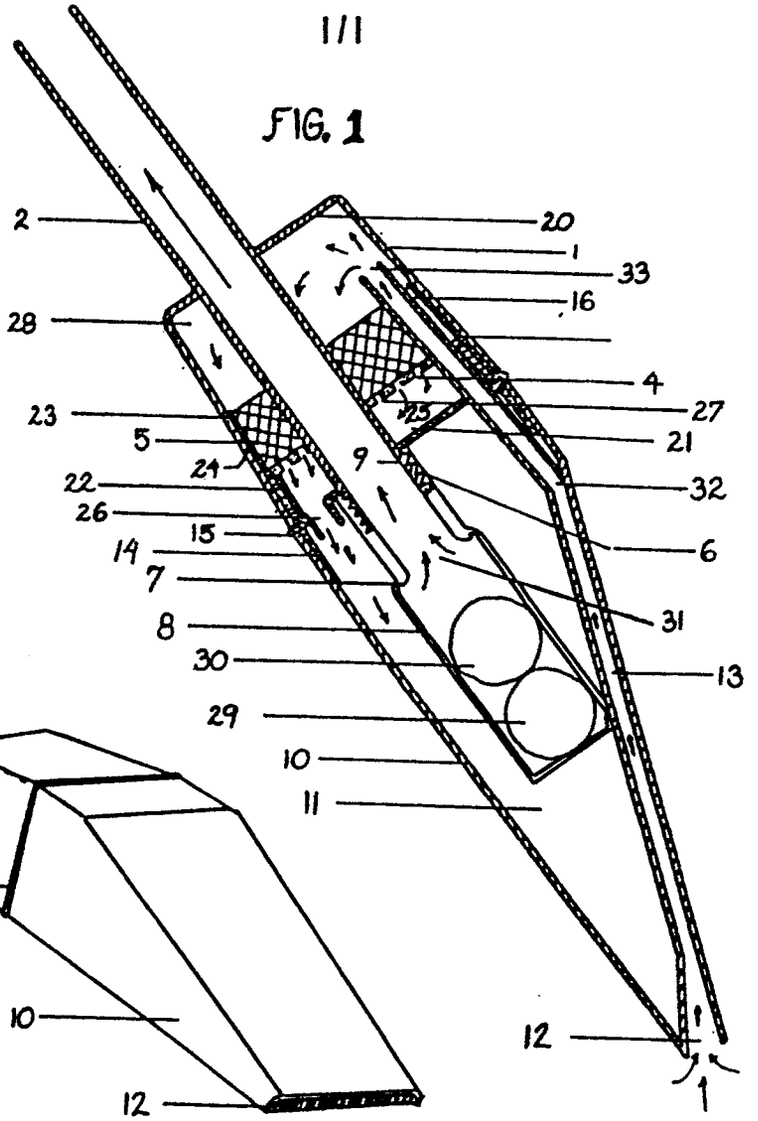


FIG. 2

FIG. 3

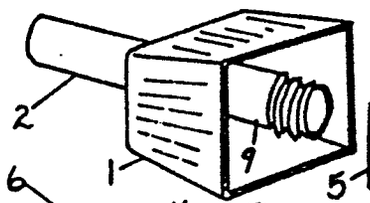


FIG. 4

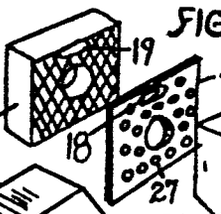
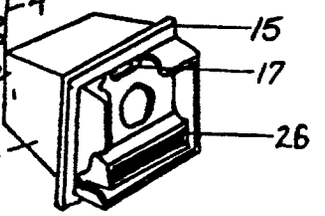


FIG. 5

FIG. 6.



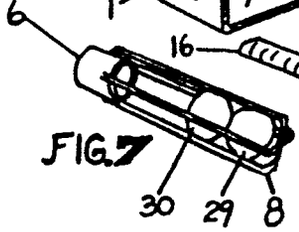
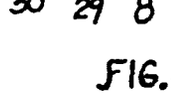


FIG. 7



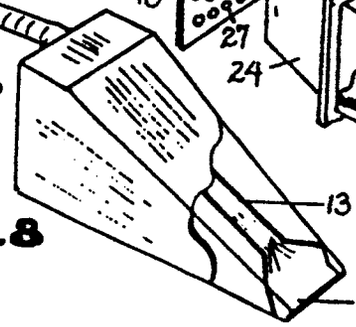


FIG. 8